

A Case Report

Anomalous Origin of Bilateral Gonadal Arteries from Renal Arteries with Extrapelvic Calyces in the Left Kidney: A Case Report

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Article History

Received: 17.07.2025

Revised: 26.08.2025

Accepted: 12.09.2025

Published: 30.09.2025

Abstract: *Background:* Variations in the origin of gonadal arteries and anomalies in renal calyceal structures are clinically significant, particularly in surgical and diagnostic contexts. *Case Presentation:* During routine dissection of a 70-year-old female cadaver, both gonadal arteries were observed to originate from the respective renal arteries. Additionally, the left kidney exhibited extrapelvic calyces, with calyceal structures located outside the renal parenchyma. *Conclusion:* This rare combination of vascular and renal anomalies underscores the importance of awareness of such variations to prevent potential complications during surgical procedures and imaging interpretations.

Keywords: Gonadal artery, Renal artery, Extrapelvic calyces, Anatomical variation, Embryology

INTRODUCTION

The gonadal arteries, typically arising from the abdominal aorta, supply the gonads and are subject to anatomical variations. Renal anomalies, such as extrapelvic calyces, though rare, can coexist with vascular variations. Understanding these anomalies is crucial for clinicians to avoid inadvertent injury during surgical interventions and to accurately interpret imaging studies.

Case Presentation

During a routine anatomical dissection in the Department of Anatomy at Alluri Sitaramaraju academy of medical sciences, a 70-year-old embalmed female cadaver was examined. Upon reflection of the abdominal viscera, both gonadal arteries were found to originate from the respective renal arteries:

- The right ovarian artery arose from the anterior aspect of the right renal artery.
- The left ovarian artery originated from the superior aspect of the left renal artery.

Further examination of the left kidney revealed extrapelvic calyces, where the major and minor calyces were located outside the renal parenchyma, yet maintained normal drainage into the ureter. No other abnormalities were noted in the surrounding structures.

Embryological Reasoning:

The development of the gonadal arteries and the renal collecting system is closely linked during embryogenesis:

- **Gonadal Artery Development:** The gonadal arteries arise from the lateral mesonephric branches of the dorsal aorta, which initially supply the mesonephros, metanephros, and gonadal ridge. During kidney ascent, some of these lateral branches regress while others persist. Persistence of the branch supplying both the kidney and gonad as a common trunk results in the gonadal artery originating from the renal artery rather than the abdominal aorta [1,2].
- **Renal Collecting System Development:** The renal pelvis and calyces develop from the ureteric bud, an outgrowth of the mesonephric duct that invades the metanephric blastema. Early branching or abnormal positioning of the ureteric bud can cause major calyces to form outside the renal sinus, resulting in extrapelvic calyces [5].

The co-occurrence of these anomalies may be explained by a developmental disturbance in the mesonephric duct derivatives, including abnormal branching and persistence of embryonic vessels and ureteric bud components. Such disturbances could affect both vascular patterning and collecting system morphology.

RESULT:

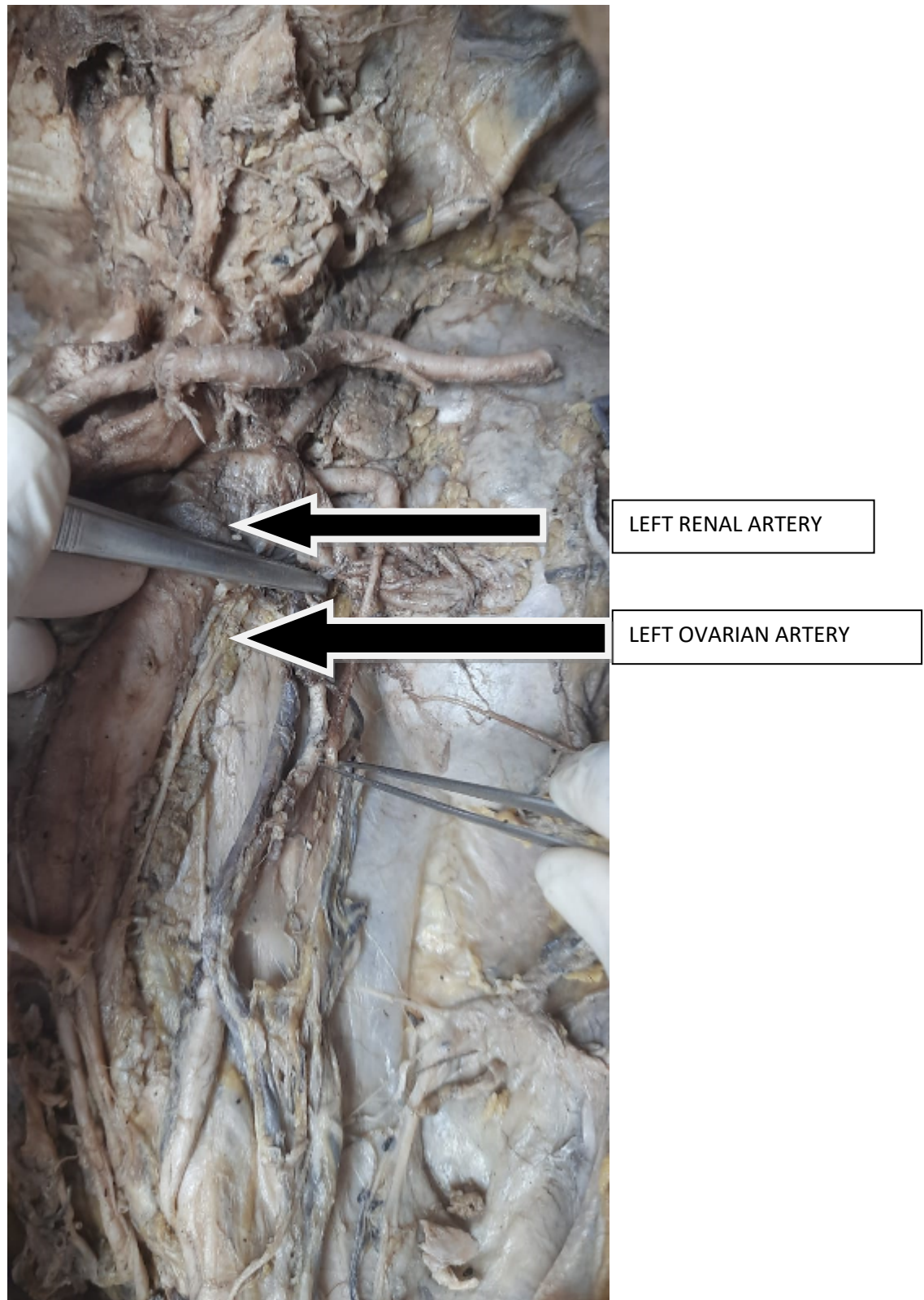
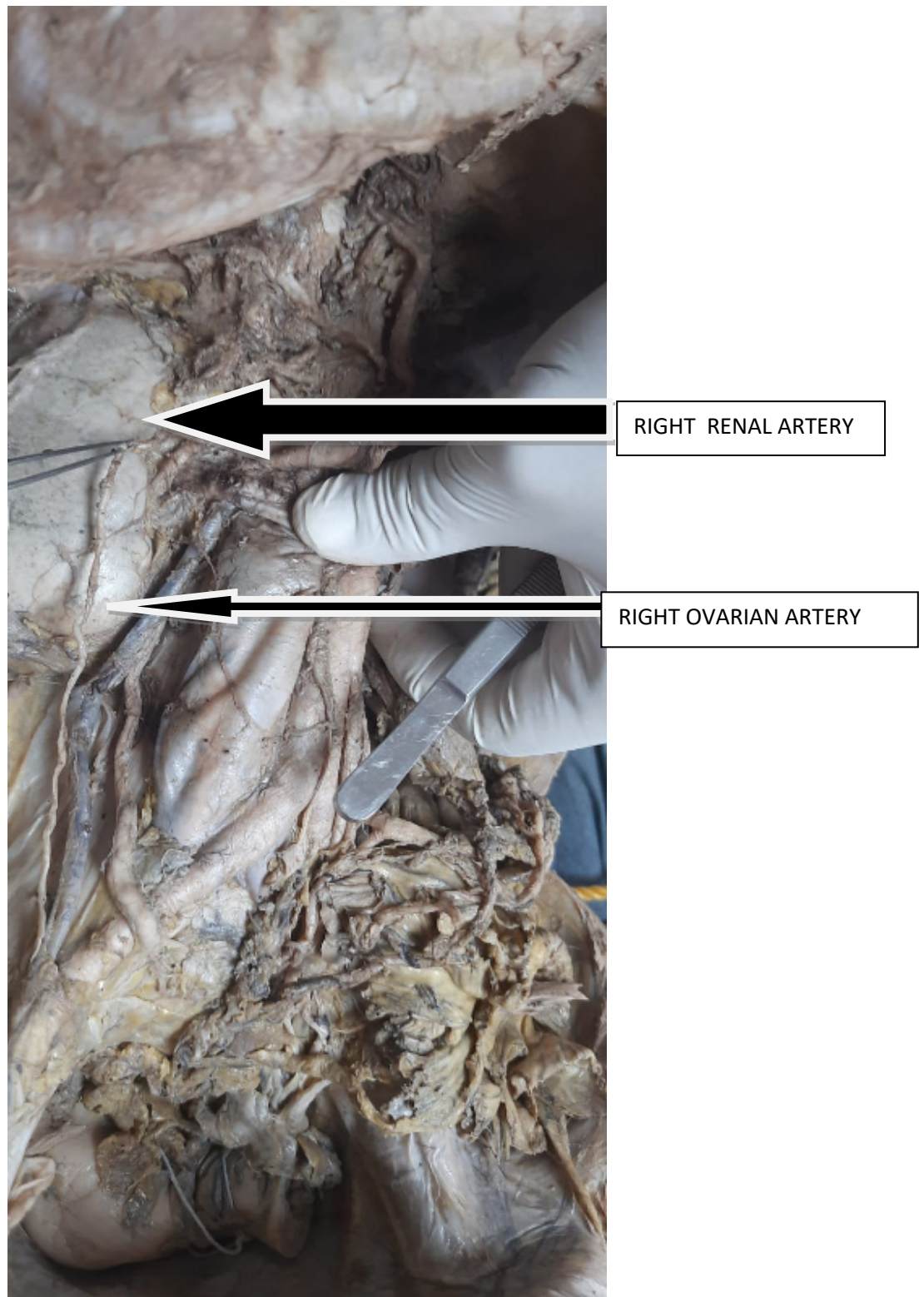


FIG 1: LEFT OVARIAN ARTERY ARISING FROM LEFT RENAL ARTERY

FIG 2: RIGHT OVARIAN ARTERY ARISING FROM RIGHT RENAL ART



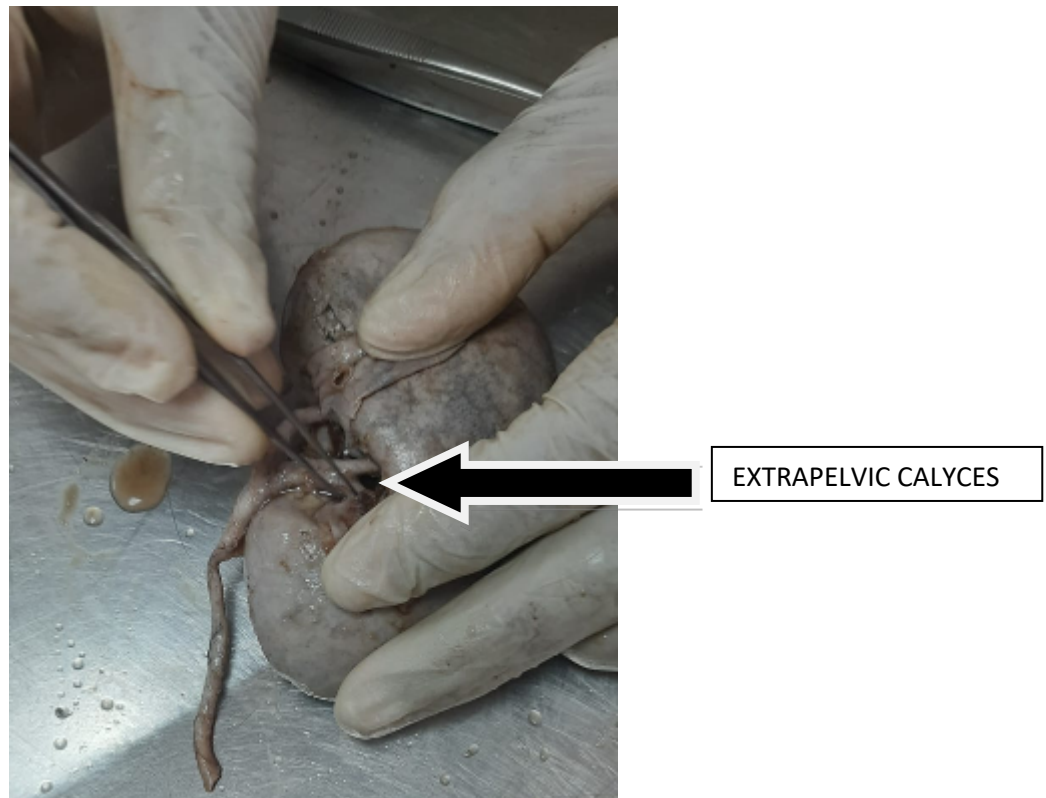


FIG 3: LEFT KIDNEY SHOWING EXTRAPELVIC CALYCES

DISCUSSION

Anomalous gonadal arteries originating from the renal artery have a reported prevalence of approximately 3–9% [3,4]. Extrapelvic calyces are rare renal collecting system variants, often asymptomatic but significant during surgical or radiological procedures [5]. The simultaneous presence of these anomalies in different kidneys of the same individual underscores the complexity of embryological development in the retroperitoneal region.

Awareness of such vascular and renal anomalies is crucial in preoperative planning to avoid inadvertent injury during nephrectomy, renal transplantation, and urological surgeries.

CONCLUSION

This case report presents a rare anatomical variation involving bilateral gonadal arteries originating from the renal arteries, accompanied by extrapelvic calyces in the left kidney. Awareness and understanding of such anomalies are essential for clinicians to prevent potential complications during surgical and diagnostic procedures.

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